

Should Congress provide special tax incentives for firms donating computers to schools?

Now pending before Congress are several bills that would provide special tax incentives to computer makers who donate computers to schools. Would providing such incentives be in the best interest of the country and taxpayers? A U.S. Congressman, who has been leading the fight on Capitol Hill for such incentives answers "YES"; a skeptical professor of computer science responds with a resounding "NO."

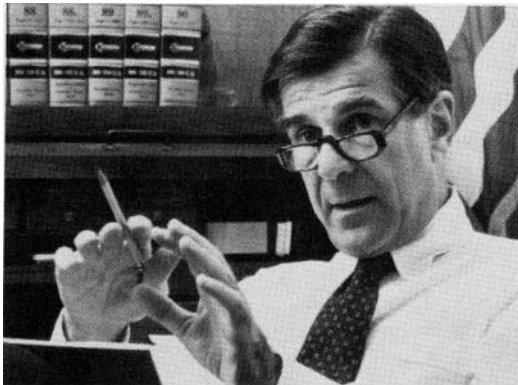
INTRODUCTION

The story begins on a plane leaving San Francisco bound for Washington, D.C. on a brisk February day in 1982. Congressman Pete Stark, Democrat from Oakland, California and a member of Congress since 1973, is headed back to his Capitol Hill office.

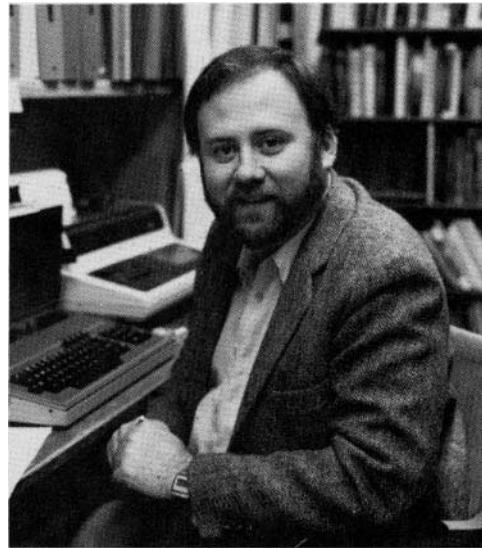
During the trip, Stark strikes up a conversation with the young man in the adjacent seat. The subject turns to computers. And Stark's traveling companion, clearly quite knowledgeable about computers and the computer industry, argues convincingly that the U.S. needs to do a lot more to bring computer education to the nation's elementary and high-school students. On parting the young man gives his name: Steve Jobs, now chairman of the board, Apple Computer, Inc.

That, according to Stark, is how he happened to get interested in ways to speed the introduction of computers into the nation's schools. Shortly thereafter, he introduced a bill calling for special tax incentives for computer manufacturers who donate computers to primary and secondary schools. In 1982 that bill passed the House and cleared a Senate committee—but failed to reach the Senate floor.

At about the same time, the California legislature was passing a law providing tax incentives for computer donors. Since that law went into effect on January 1, 1983, over 11,000 computers have been donated by numerous microcomputer manufacturers to primary and secondary schools there.



Congressman Pete Stark



Professor Hal Berghel

In 1983, Stark's bill (one of several similar bills now pending in Congress) was reintroduced. Hearings on it were held before the House Subcommittee on Select Revenue Measures on November 11, 1983.

Pointing to the country's present immersion in the microcomputer revolution and the recent flurry of reports on the poor health of the nation's primary and secondary school system, some Congressional insiders say chances of passage of this Stark bill or a similar one in 1984 are excellent.

While all this legislative bustle was going on, half way across the country, on the University of Nebraska campus, computer science professor Hal Berghel was carefully examining a newspaper article that referred to Stark's legislation as "the Apple bill."

Determined to find out whether such a bill was in the interest of the taxpayers, the skeptical professor launched a one-man probe, gathering and carefully examining all relevant bills and other documents. Berghel, who has been teaching computer science at Nebraska for six years, presents his findings following Stark's argument in favor of the legislation.

Gene Dallaire

THE BEST WAY TO PUT COMPUTERS INTO SCHOOLS TODAY

CONGRESSMAN FORTNEY H. (PETE) STARK

As the computer revolution continues to gather force, the question becomes: What is the best method of exposing our children to the tools that will comprise their futures?

What we need to do is put computers into the mainstream of our educational system. However, the dismal financial state of the country's school systems is well documented. Most schools do not have the resources available to purchase computer equipment. Yet the urgency for computers in the classroom grows daily.

I have introduced two bills in Congress that would put computers into schools: H.R. 701, "The Computer Contribution Act of 1983," and H.R. 3098, "Technology Education Assistance and Development Act of 1983." Essentially, both pieces of legislation use the tax code to buy the computers. A computer company receives a tax deduction for donation of computer equipment to schools. Let us discuss H.R. 701, since this bill has had the most exposure and the most legislative history.

The bill amends section 170(e) of the tax code. It provides for a more generous charitable deduction for newly manufactured computers donated by corporations to elementary or secondary schools. The deduction received by the computer-equipment manufacturers would be the cost of production plus one half of the manufacturer's normal markup—not to exceed two times the cost of manufacturing the item.

The Best Marriage of Many Interests

I think this legislation is one of the best marriages of a variety of interests that I have seen. Children and education are served on a national basis in that computers are put into schools. Schools and school districts are

provided with a capital asset and a significant teaching tool they otherwise would not have. The taxpayer gets top equipment at a bargain price. And it is equipment that the taxpayer would be buying sooner or later. Business benefits from the publicity of the donations and whatever residual benefits accrue from having children learn on a computer with the company's name on it.

The deduction the corporation would receive is designed in such a manner that a company would have to make a sacrifice to give the computers. That is the point of a charitable deduction. If you assume the corporation donating the computers is in the highest tax bracket (and virtually all taking this deduction would be), the figures would look as follows. The highest corporate tax rate is 46 percent. Assuming that a corporation took maximum advantage of H.R. 701, it could deduct up to 92 percent of the cost of manufacturing the computer equipment.

A corporation in the 46 percent tax bracket would normally pay \$46,000 in taxes for every \$100,000 in profit. If the corporation donated \$50,000 in computers, it would work out to reducing taxable income by



The opinions presented in these articles are those of Messrs. Stark and Berghel—and not those of ACM.

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\$100,000 since the deduction allows for two times the cost. The benefits to the corporation would be saving \$46,000 in taxes. It does so at the cost of donating \$50,000 worth of equipment. Its "out-of-pocket" charitable gift then would be \$4,000.

The cost to the company is larger than just the difference between the cost of the equipment and the tax savings. The administrative costs of running the distribution program should be considered. Also, as the California experience with a similar program has shown, most companies have been providing equipment and services beyond what they would receive special tax treatment for.

Some claim implementation of the law would lead to overproduction of computers. I do not think that there is any real problem in that. First, the corporation would rather sell its product than give it away. Second, a corporation that manufactures computers has a lag time of three to six months between the beginning of production and the final product (the bill provides that the equipment donated must have been manufactured within the previous six months). The result is that production decisions are based on the best demand forecasts available to a company. The forecasts need to be accurate and precise. It is not good business sense to significantly overproduce.

Even with a relatively high expectation of sales, the cost of money and other inputs prevents a company from random overproduction. The company then works with its suppliers to have the parts available and tools up its production line. Suppliers require a lead time that the computer manufacturer needs to work into the production schedule.

The company is also limited in its overproduction by its physical plant capacity to produce computers. Unless the company makes a conscious production decision to take advantage of the deduction, it is unlikely to have significant overproduction that could be used for the tax deduction provided for in H.R. 701. It would not make good business sense. Regardless, it is crucial to remember that there would have to be some surplus for the computers to be donated, whether artificial or market induced.

But not just any surplus could be donated. Standards are outlined in the bill to prevent inadequate equipment from being offered to a school system. Ultimately, the school itself can refuse to accept the contribution if the school feels the equipment fails to meet its needs.

What the Proposed Bills Would Cost Taxpayers

The revenue impact of H.R. 701 is limited. The Joint Committee on Taxation estimated in early November 1983 that it would cost about \$60 million if H.R. 701 were implemented. The bill also limits the deduction to one calendar year or two tax years. This sunset provision prevents the deduction from becoming perennial without it being reviewed. The sunset provision also serves to limit the revenue impact.

The state of California passed legislation last year modeled after legislation identical to H.R. 701. So far,



California has had good experience with the law. Computers are going to schools in California, thousands of them. Children are learning on them. Youngsters in California are being prepared for life in the computer age.

There is room to amend H.R. 701 to add items such as teacher training packages or software in the deduction. Hearings on the bill have pointed out the need for such items. The revenue impact of these items has not been estimated but it is not likely to be significant. Legislation identical to H.R. 701 passed the House of Representatives in 1982 by a vote of 323 to 62.

Computers are a versatile learning tool. They can be used as an instrument of learning, tailored to the individual student's learning abilities. They can be used to express concepts that just cannot be made as clear on the blackboard. In the schools, students can start programming and learn other skills that could become as important as writing is today. Most importantly, perhaps children will learn that computers are tools that can help them to expand their horizons—rather than seeing them as mystifying instruments to be feared.

I feel that it is of the greatest urgency that we begin to integrate computers into our nation's schools. It is imperative that we begin to get our young people exposed to computers. The long-term benefits impact our nation's economy and our ability to remain a world leader on the cutting edge of technology.

Theoretically, there may be better ways to get computers into schools. Politically and practically, legislation along the lines of H.R. 701 is the fastest, most efficient, least bureaucratic, and inexpensive way.

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TAX INCENTIVES FOR COMPUTER DONORS IS A BAD IDEA

HAL BERGHEL

A rigorous lobbying campaign orchestrated by micro-computer manufacturers together with the staunch support of former Governor Edmund Brown, Jr., [2] culminated this past year in changes in California's tax laws. Those changes provide economic incentives to computer manufacturers for the donation of computers to public schools. Now considerable pressure is being placed on Congress to provide similar encouragement at the national level. It is not obvious that such encouragement will be in the long-term public interest.

There are at present no fewer than eight pieces of pending legislation before both houses of Congress concerning Federal support of computer literacy programs, with new legislation of this sort being introduced nearly monthly. Pending legislation now includes: H.R. 91, "Computer Equipment Contribution Act of 1983;" H.R. 701, "Computer Contribution Act of 1983;" S. 108, untitled; H.R. 2417, "Computer Contribution and Teacher Training Act of 1983;" S. 1194, "Technology Education Assistance and Development Act of 1983;" S. 1195, "High Technology Research and Educational Development Act of 1983;" H.R. 3098, "Technology Education Assistance and Development Act of 1983;" and H.R. 3750, "Computer Literacy Act of 1983."

What the Pending Bills Call For

Of these bills, H.R. 3750 belongs to a separate class for it alone calls for direct appropriations "... to provide assistance to local educational agencies and institutions of higher education to promote computer literacy among elementary and secondary school students and their teachers ..." [11, p. 1]. Although the other bills share this goal, they intend to achieve it by making significant alterations in the Internal Revenue Code (IRC). Specifically, they seek to modify that portion of the IRC that deals with corporate contributions to non-profit organizations.



Section 170(e)(1) of the IRC [7], known as the "General Rule" for contributions, allows the contributor of property to certain nonprofit institutions to reduce his tax liability by the amount of his basis in the property.¹ The reasoning behind this section is that if a contributor is generous enough to make a charitable contribution, the community should at least share some of the contributor's loss. Apparently, its authors felt that it is in the public interest to so encourage such contributions in order to preserve the vitality of charitable institutions. Whether this provision was ever in the long-term public interest is not at issue here. Whether this provision should be modified to single out computer manufacturers for special treatment is.

¹ Basis is the total cost of an asset as defined for Federal Tax purposes [5, section 1471-11].

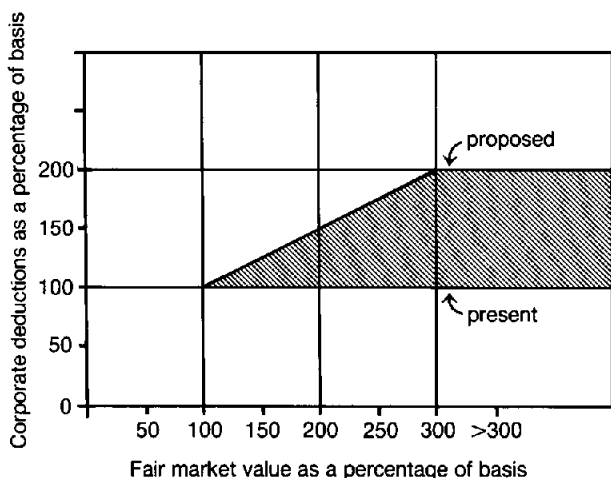


FIGURE 1. The Impact of HR 701 on Corporate Deductions for Contributed Property

Section 170(e)(1) of the IRC is quite specific in its treatment of contributed property. For such contributed short-term assets² as production and inventory items, the contributor may only reduce his tax liability by his basis in the property. In the words of the IRC,

... The amount of any charitable contribution of property ... shall be reduced by ...
 (A) The amount of gain which would not have been long-term capital gain if the property contributed had been sold by the taxpayer at its fair market value ... [7, p. 25, 204]

The "amount of gain" referred to in (A) is the difference between the owner's basis in and the sale price of such property.

The effect of those bills above that seek to modify the tax code would be to subsume computer contributions under the "Special Rule" (170(e)(3)).³ This "Special Rule" entitles the contributor to a reduction of tax liability determined by the following formula:

$$\text{Deduction} = \text{Basis} + ((\text{Fair Market Value} - \text{Basis})/2)$$

with a ceiling of twice their basis.⁴ Figure 1 graphically represents the effect of this change.

An Incentive to Overproduce Computers

Some sense of the consequences of this change can be derived from Figure 2. Note that the after-tax cost of production for corporations making use of the proposed change in the IRC is as low as 8 percent. Further, since it takes only \$100,000 of annual profits to place a corporation in the highest (46 percent) tax bracket, most if not all manufacturers would fall into this category.

² Usually those held for less than one year.
³ More properly, H.R. 91, H.R. 701, S. 108, and H.R. 2417 seek to subsume these contributions under IRC 170(e)(3). The others, with the exception of H.R. 3750, propose incorporation of this tax-deduction feature into another section of code (Ch. 1, SCh.B, Part VI, sect.174A). The overall effect, as far as tax deductions for contributed short-term assets of this type, is exactly the same.
⁴ H.R. 2417 is unique in that it establishes a ceiling at 125 percent of basis.

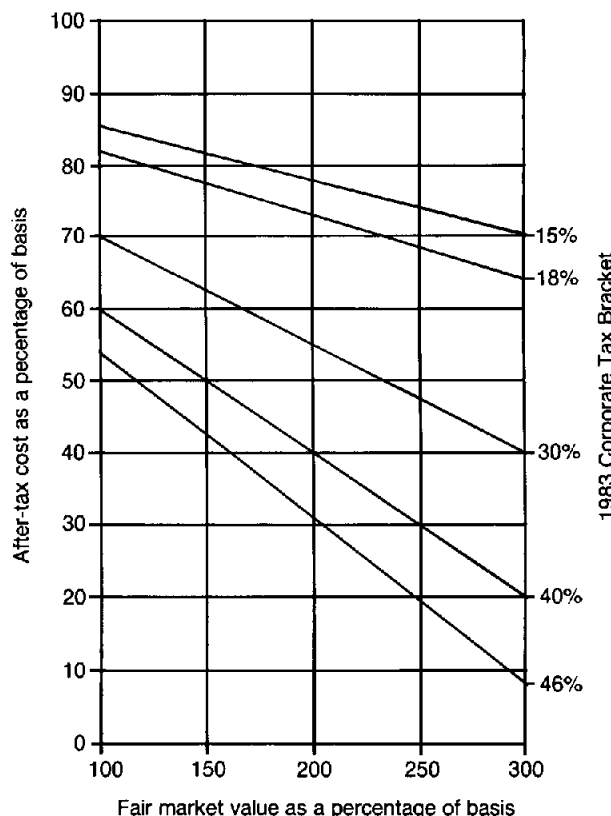


FIGURE 2. After-tax Costs of Contributed Property by Corporate Tax Bracket

Should the retail price of the computer equipment be three times their basis (not an altogether unlikely occurrence), these manufacturers would have their after-tax cost of manufacturing reduced by 92 percent. Although this will not in and of itself encourage companies to manufacture equipment solely for the purpose of donations, it will dramatically reduce the risks of overproduction. A manufacturer may well overproduce knowing that should the market fail to absorb the excess, the taxpayer may absorb 92 percent of the cost of their mistake. For obvious reasons it may work to the public detriment to offer this encouragement.

In addition to the minimization of risks of overproduction, the code change also has other unpleasant consequences. First, it is designed to most reward those companies in the highest corporate tax brackets and those whose products have the greater profit margins. Note that this is not a problem so long as the contributions are subsumed under the "General Rule."

Secondly, it seems unlikely that school districts will turn away such gratuities even though no immediate need is present. If only 25 percent of the contributed computers are unneeded, the cost to the taxpayer is 68 percent greater than if the needed 75 percent were purchased from the manufacturer at his cost. Sales at cost would still gain the manufacturer the sought-after free advertising, the potential of which may be enormous. As one marketing manager for Apple stated: "You learn

on a particular computer, you become comfortable on a particular computer, all things being equal, you're likely to buy that computer." [8]

If the computer industry's perception of the potential of "hands-on" advertising is positive, such acquisitions would be easy to come by. However, the real advantage would be that the school districts would be responsible for both the justification of the acquisition and the overall tax impact.⁵

It must be understood that each and every contribution carries with it a direct cost to the taxpayer. Perhaps the most objectionable feature of pending legislation is that it encourages school systems to behave in ways that when generalized are fiscally irresponsible. The appropriations legislation, H.R. 3750, minimizes this problem, though at a cost of \$3 billion over 10 years.

The Issues the Bills Fail to Address

The tax consequence of the proposed legislation is not the only objectionable feature. Table I summarizes these bills in terms of their major provisions.⁶ One immediate concern is the lack of consideration given to software. H.R. 91, H.R. 701, and S. 108 allow only hardware to qualify as a contribution. Inasmuch as packaged software is a *sine qua non* in a computer-aided-instruction (CAI) environment, it seems both arbitrary and unreasonable to accord hardware a privileged status. H.R. 2417 only allows contributed software to qualify for a deduction if it is provided by the hardware manufacturer.

It would seem that, if Congress wanted to provide the student with the best of facilities, its members would do all they could to encourage the acquisition of the widest range of current software. Slighting the schools on software is certainly not consistent with the overall ambitions of the proposals at hand. Further, only S. 1194, S. 1195, and H.R. 3098 allow contributed services to qualify for tax credit. A school system that lacks a sufficient budget to support its acquisitions may find them to be an onerous gratuity.

The issue of the sources and types of hardware that will qualify as a contribution seems to have been treated in an equally cavalier fashion. Only H.R. 2417, S. 1194, S. 1195, and H.R. 3098 require that a monitor be included in the hardware package. It is difficult to comprehend how the student will use these computers without a monitor. Perhaps the authors of these bills feel that similar legislation in the past has inundated schools with unneeded televisions that can be scavenged for this purpose. Further, only H.R. 2417 requires that the contribution contain some form of secondary storage. Once again it is hard to imagine nontrivial uses of computers with this deficiency.

⁵ Particularly worrisome in this regard is the fact that neither H.R. 701 nor S. 108 require the approval of the school district's governing board for the contribution. Presumably, schools and teachers may act unilaterally.

⁶ Some bills contain additional provisions that are beyond our immediate concern. S. 108, for example, provides for tax credits to corporations that provide teachers to vocational schools. H.R. 3750 allows for funding of Teacher Training Institutes, and so forth. However, the nucleus of that portion of each bill relevant to our discussion is reflected in Figure 3.



Although few bills require that monitors and peripherals be included in the contribution, all bills make allowances for them. However, not all allowances are intuitive. H.R. 91, H.R. 701, and H.R. 2417 require that, if peripherals be contributed at all, they must be contributed by the same manufacturer that contributed the CPU. It is not obvious how any particular public benefit accrues by excluding manufacturers of plug-compatible peripherals.

Further all nonallocation bills except S. 108 specifically allow for the contribution of "any installation equipment." The public should be aware that a liberal reading of this provision would include such equipment as air purifiers, temperature/humidity control systems, static control products, and computer furniture. Such a liberal interpretation could extend this questionable tax incentive to a variety of industries.

Legislation Too Hastily Conceived

To be sure, the aforementioned are not the only areas of concern. Only four of the bills require that the contributed property be under some sort of warranty. Again, only four make mention of a concern that the equipment be determined in advance to be suitable for use in an educational environment. Further, each of the bills requires that the donee guarantee compliance with the terms of the bill only to the contributor. This last provision is perhaps the strangest feature of all.

As the above discussion illustrates, much of the legislation at hand seems poorly conceived and hastily prepared. What is most disappointing about them all is that they appear to approach a worthwhile goal with strategies that guarantee abuse.

As mentioned earlier, there already exist adequate incentives, both in section 170(e)(1) of the IRC and in

TABLE I. Major Features of Pending Computer Contributions Legislation

| | H.R. 91 | H.R. 701 | S. 108 | H.R. 2417 | S. 1194 | S. 1195 | H.R. 3098 |
|---|----------------|-----------|-----------|------------------|------------------------------|------------------|------------------|
| Date of | | | | | | | |
| Introduction | 1-3-83 | 1-6-83 | 1-26-83 | 5-3-83 | 5-3-83 | 5-3-83 | 5-23-83 |
| IRC | 170(e)(1) | 170(e)(1) | 170(e)(1) | 170(e)(1) | 170(e)(4) | 170(e)(4) | 170(e)(4) |
| Duration | 1 yr | 1984 | open | 1 yr | 5 yrs | 5 yrs | 5 yrs |
| Focus | | | | | | | |
| Public Schools | X | X | | X | X | X | X |
| Low/Mid Inc. Public Schools | X ¹ | | | | | | |
| Vocational | | | X | | | X | |
| Higher Ed. | | | | | X | X | X |
| Museums | | | | | X | | X |
| Prisons | | | | | X | | X |
| Allowed Contributions | | | | | | | |
| Hardware | X | X | X | X | X | X | X |
| Software | | | | X | X | X | X |
| Noncomputer Instruments | | | | | X | X | X |
| Services | | | | | X | X | X |
| Max. Corporate Contribution | open | open | open | open | 20% of annual sales | | |
| Max. Corporate Deduction | open | open | open | open | 10% of annual taxable income | | |
| Restrictions on Contributor | | | | | | | |
| -must be manufacturer | Y | Y | N | Y | Y | Y | Y |
| -max. age of equipment ³ | 6 mos | 6 mos | open | 6 mos | 6 mos | 6 mos | 6 mos |
| -unused | Y | Y | open | Y | Y | Y | Y |
| -100% contribution | Y | Y | Y | Y | Y | Y | Y |
| -plan ² | N/R | N/R | N/R | Y | Y | Y | Y |
| Max. Deduction/Unit (% of basis) | | | | | | | |
| Hardware | 200% | 200% | 200% | 125% | 200% | 200% | 200% |
| Software | N/A | N/A | N/A | N/A | FMV | FMV | FMV |
| Hardware Requirements | | | | | | | |
| Languages Supported | 3 | 3 | open | 3 | 3 | 3 | 3 |
| Min. Primary Storage | 32K | 32K | open | 16K ⁴ | 16K ⁴ | 16K ⁴ | 16K ⁴ |
| Monitor Required | No | No | No | Yes | Yes | Yes | Yes |
| Peripherals Required | none | none | none | DISK only | none | none | none |
| Must be Suitable for Educ. Use | N/R | N/R | N/R | Y | Y | N/R | Y |
| Must be Covered by Warranty | N/R | N/R | N/R | Y | Y | Y | Y |
| Restrictions on Use | | | | | | | |
| -primarily for student education | Y | Y | Y | Y | Y | Y | Y |
| -compliance guarantee | Y | Y | Y | Y | Y | Y | Y |
| -governing body consent | Y | N | N | Y | Y | Y | Y |

LEGEND: N/A = not allowed N/R = not required FMV = fair market value

¹ At least 75% of total contribution must be to low/middle income schools.

² Four bills require that contribution be made pursuant to written plan guaranteeing equitable distributions of property.

³ Since date of manufacture.

⁴ Must be expandable to 48K.

the advertising potential to the contributors, to encourage manufacturers to provide the school systems with additional computational resources. That the greater use of computers and CAI in public schools and universities is desirable is not open to serious doubt. In an appropriate context where use is supervised by skilled personnel, computers have great pedagogical value. However, in the absence of such a context they will be of marginal utility and may even detract from the learning experience.

The indiscriminate acquisition of computing resources that these pieces of legislation encourage will accomplish no more than more conservative approaches that require that the donee justify both the need for the resources and the ability to use them effectively prior to the actual acquisition.

In sum, the lack of public control over the contributions together with the enormous potential costs force me to seriously question the wisdom of enacting this type of legislation.

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Congressman Stark and Professor Berghel were given the opportunity to respond to each other's viewpoints

Berghel's response to Stark:

Apparently, Congressman Stark and I are one concerning the specifics of the proposed legislation. Our disagreement concerns only the desirability of enacting the proposed legislation, and the anticipated overall tax consequences. In his words, this sort of legislation is "... one of the best marriages of a variety of interests. . ."

My belief, to extend his metaphor, is that this is going to be an extremely expensive wedding, and that the cost of the nuptials should be borne by the betrothed and not by the federal tax payer.

According to Stark, the estimated cost to the taxpayer of H.R. 701 would be \$60 million. Let's assume for the moment that the donated equipment would in every case be complete (i.e., no additional software, peripherals, furniture, etc., would be needed to gain full advantage of the donated computers).

At an average "donation cost" to the taxpayer of \$1,000 (92 percent of the manufacturer's cost of production), the number of computers to reach the schools would be 60,000. In the U.S., there are 40 million students currently enrolled in primary and secondary schools. The projected \$60 million thus buys only one computer for every 663 students. I can't imagine that a school district would be content with

this ratio. I conjecture that the public expense of H.R. 701, or any of its siblings, will be very much greater than the estimate.

Consider that the proponents of H.R. 3750 claim that computer resources sufficient to promote computer literacy would cost \$3 billion over the next 10 years. Stark's figures seem suspect to me.

Even if the estimates were low by a factor of 10, the price would be justified if a genuine deficiency in our educational system were overcome. Stark seems to believe that one of our primary educational objectives should be to expose our children to computers.

My feeling is that our goal should be to prepare our children for computers. For a student well-grounded in formal logic, discrete mathematics and the physical sciences, computer literacy will be a breeze. In the absence of such training, no degree of "exposure" to computers will overcome their deficiencies.

In my view, if there is a genuine deficiency in our educational system, it is that it has lost sight of the objectives of a diversified, well-rounded education—not that it has failed to keep pace with technological change.

Of course, my previous remarks are concerned primarily with the issue of computer literacy (i.e.,

where the computer is the object of study). In addition, the computer may be an instrument for study—an instructional tool of enormous pedagogical benefit when used in an appropriate context by skilled personnel.

But the key to success is selective placement in subject areas where the skill levels of the instructional staff justify acquisition. For example, the use of LOGO to teach mathematical concepts could be of significant instructional value. However, little benefit accrues to the use of LOGO as an end in itself. In the few examples that I have seen of the use of LOGO in the public schools, the emphasis has been more on this latter use than on the former. I have doubts whether Papert's objectives are being realized. All too often the students are more concerned with the use of the Turtle to draw on the CRT than with geometrical concepts. And the influx of computers into the public schools will do little to change the situation.

Although the previous reflections bear little on the topic, they illustrate why I think that the unrestricted acquisition of computers by a school system is a bad idea. I cannot imagine how a school system could resist the offer of "free" computers, irrespective of whether their need is real or imagined. For this reason, I disagree that the schools will gain computer equipment "... that the taxpayer would be buying sooner or later." If required to justify their computer acquisitions, school systems would be found to have much more modest and purposeful computational requirements.

I remarked in my article that such legislation as H.R. 701 "... will not in and of itself encourage companies to manufacture equipment solely for the purpose of donations, (but) it will dramatically reduce the risks of over-production."

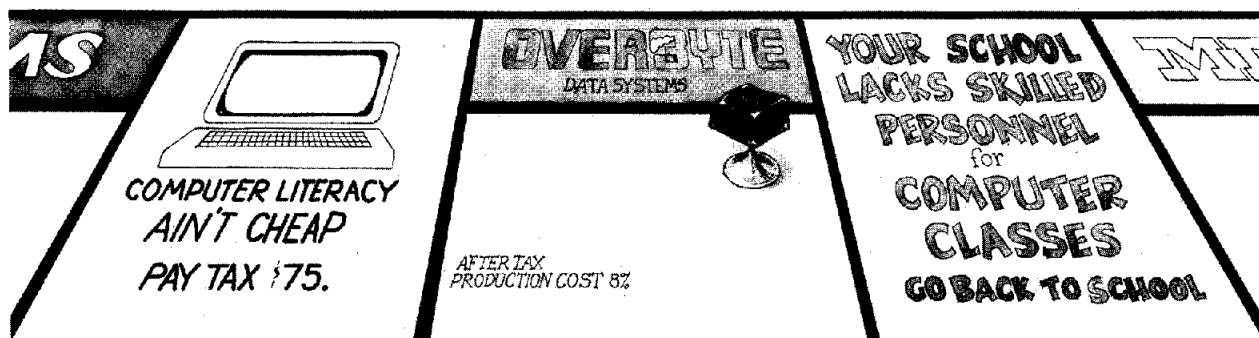
The legislation under consideration reduces these

risks so long as there are school systems that will accept these donations. If a manufacturer thinks there is a 90 percent probability there will be a demand for x units and a 60 percent probability there will be a demand for $x + y$ units, he or she may well overproduce knowing that, as far as the overproduction is concerned, the worst case is an 8 percent loss on y units. One would certainly be more willing to gamble in this case than if the worst case were a 100 percent loss.

As I have argued, the cost of the proposed legislation seems to far outweigh any public benefits that might accrue. This is not to deny that there are educational advantages to the use of computers in the schools. In some circumstances, mathematical, logical, and scientific concepts may be better taught in a carefully prepared experimental environment. Involvement in practical projects often times generates enthusiasm that would not otherwise be present. Further, computer experiences may even make abstract concepts more comprehensible.

But these observations do not support the claim that a significant increase in the number of computers in the schools will translate into a significant increase in student performance. We need to get away from this more-is-better syndrome and focus our attention on the quality of the educational experience rather than the quantity of teaching aids available. We have ample evidence that teaching aids are not the primary determinants of a successful educational environment.

Stark has done little to assuage my fears that the proposed legislation does little more than provide a method of indirectly subsidizing computer manufacturers. In addition, and for reasons given earlier, this legislation is as a whole poorly thought through.



Stark's response to Berghel:

The ideal result of the enactment of H.R. 701 would be that it would put computers in every school in the country. However, that is not expected to happen. The law is not compulsory; firms are not obligated to donate computers. Also, with a sunset provision of one year, there literally is not enough time for companies to produce enough excess computers to put one in every school, even if they wanted to. Based on these assumptions, the revenue impact would be limited.

Berghel's analysis fails to really come to grips with the underlying premise of H.R. 701, which is that the bill puts computers into schools. Berghel does not seem to have made up his mind as to whether he wants computers in schools or not. He argues both that computers are useful learning tools and that they are really unnecessary in schools.

Children can be taught without computers. Students have learned without them for centuries. Chil-

dren also learned well before blackboards became an integral part of the teaching process. Yet, the advantages of computers in teaching children are not only recognized by Berghel, but by children, educators, parents, school boards, etc. That computers can contribute greatly to learning in schools has become virtually axiomatic. Yet, these machines are not meant to replace teachers, only to supplement them.

The kind of learning I am talking about should not be confused with creating tens of millions of computer programmers. Programming could be taught, but not everyone needs to know how to program, just like everyone does not need to be an auto mechanic to take full advantage of a car.

Computers can present concepts in innovative ways. They can be tailored to the fast or slow learner. We are only beginning to realize the learning potential that computers can provide. And this potential increases daily with the introduction of new innovations in equipment and software.

Berghel expresses concern that children will doodle with computers and not utilize the learning potential of the machine. I suggest that that is no different than a child doodling with pen and paper. Just because a student uses a learning device to play with hardly means that person should be denied access to it.

The underlying current of Berghel's arguments seems to be that something inherently evil is being

done to the federal tax code to the detriment of generations of American taxpayers. I do not believe that is true. The tax code is being used as a tool to provide learning opportunities for our children. If computers are not going to become an integral part of the future, then there is no need for this legislation. However, it is my belief that computers do represent the future and that the sooner we can begin to put computers in schools the better.

Yes, this legislation will cost the taxpayer money. Yes, it will cause a distortion in the tax code for one year by adding a "loophole." But the ultimate impact of H.R. 701 is worth it. It is a bridge to the future for our children.

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TAX INCENTIVES FOR COMPUTER DONORS IS A BAD IDEA

HAL BERGHEL

A rigorous lobbying campaign orchestrated by micro-computer manufacturers together with the staunch support of former Governor Edmund Brown, Jr., [2] culminated this past year in changes in California's tax laws. Those changes provide economic incentives to computer manufacturers for the donation of computers to public schools. Now considerable pressure is being placed on Congress to provide similar encouragement at the national level. It is not obvious that such encouragement will be in the long-term public interest.

There are at present no fewer than eight pieces of pending legislation before both houses of Congress concerning Federal support of computer literacy programs, with new legislation of this sort being introduced nearly monthly. Pending legislation now includes: H.R. 91, "Computer Equipment Contribution Act of 1983;" H.R. 701, "Computer Contribution Act of 1983;" S. 108, untitled; H.R. 2417, "Computer Contribution and Teacher Training Act of 1983;" S. 1194, "Technology Education Assistance and Development Act of 1983;" S. 1195, "High Technology Research and Educational Development Act of 1983;" H.R. 3098, "Technology Education Assistance and Development Act of 1983;" and H.R. 3750, "Computer Literacy Act of 1983."

What the Pending Bills Call For

Of these bills, H.R. 3750 belongs to a separate class for it alone calls for direct appropriations "... to provide assistance to local educational agencies and institutions of higher education to promote computer literacy among elementary and secondary school students and their teachers ... " [11, p. 1]. Although the other bills share this goal, they intend to achieve it by making significant alterations in the Internal Revenue Code (IRC). Specifically, they seek to modify that portion of the IRC that deals with corporate contributions to non-profit organizations.



Section 170(e)(1) of the IRC [7], known as the "General Rule" for contributions, allows the contributor of property to certain nonprofit institutions to reduce his tax liability by the amount of his basis in the property.¹ The reasoning behind this section is that if a contributor is generous enough to make a charitable contribution, the community should at least share some of the contributor's loss. Apparently, its authors felt that it is in the public interest to so encourage such contributions in order to preserve the vitality of charitable institutions. Whether this provision was ever in the long-term public interest is not at issue here. Whether this provision should be modified to single out computer manufacturers for special treatment is.

¹ Basis is the total cost of an asset as defined for Federal Tax purposes [5, section 1471-11].

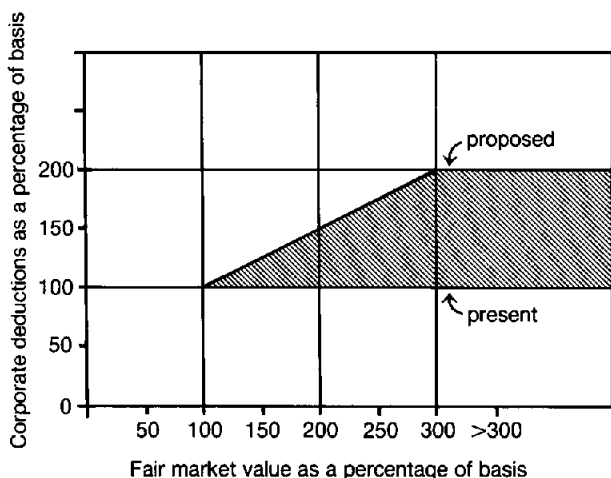


FIGURE 1. The Impact of HR 701 on Corporate Deductions for Contributed Property

Section 170(e)(1) of the IRC is quite specific in its treatment of contributed property. For such contributed short-term assets² as production and inventory items, the contributor may only reduce his tax liability by his basis in the property. In the words of the IRC,

- ... The amount of any charitable contribution of property ... shall be reduced by ...
- (A) The amount of gain which would not have been long-term capital gain if the property contributed had been sold by the taxpayer at its fair market value ... [7, p. 25, 204]

The "amount of gain" referred to in (A) is the difference between the owner's basis in and the sale price of such property.

The effect of those bills above that seek to modify the tax code would be to subsume computer contributions under the "Special Rule" (170(e)(3)).³ This "Special Rule" entitles the contributor to a reduction of tax liability determined by the following formula:

$$\text{Deduction} = \text{Basis} + ((\text{Fair Market Value} - \text{Basis})/2)$$

with a ceiling of twice their basis.⁴ Figure 1 graphically represents the effect of this change.

An Incentive to Overproduce Computers

Some sense of the consequences of this change can be derived from Figure 2. Note that the after-tax cost of production for corporations making use of the proposed change in the IRC is as low as 8 percent. Further, since it takes only \$100,000 of annual profits to place a corporation in the highest (46 percent) tax bracket, most if not all manufacturers would fall into this category.

² Usually those held for less than one year.
³ More properly, H.R. 91, H.R. 701, S. 108, and H.R. 2417 seek to subsume these contributions under IRC 170(e)(3). The others, with the exception of H.R. 3750, propose incorporation of this tax-deduction feature into another section of code (Ch. 1, SCh.B, Part VI, sect.174A). The overall effect, as far as tax deductions for contributed short-term assets of this type, is exactly the same.
⁴ H.R. 2417 is unique in that it establishes a ceiling at 125 percent of basis.

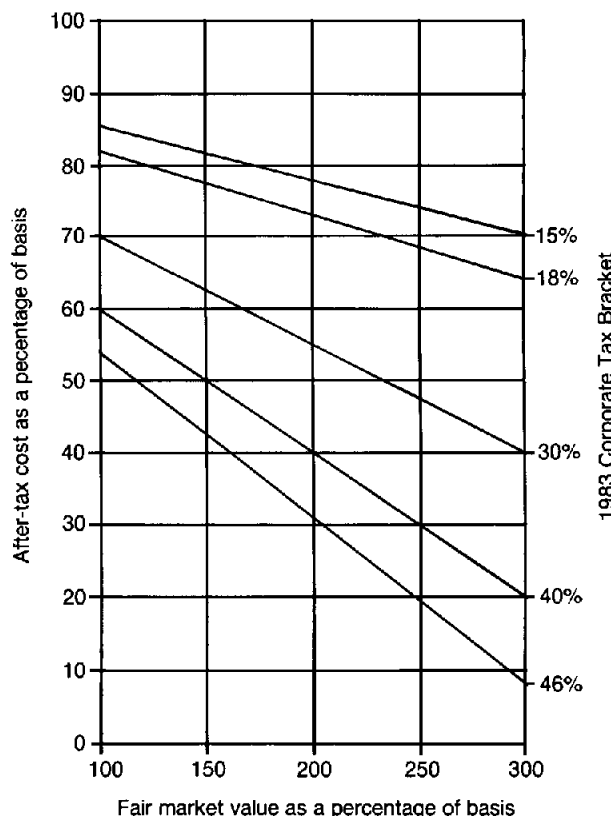


FIGURE 2. After-tax Costs of Contributed Property by Corporate Tax Bracket

Should the retail price of the computer equipment be three times their basis (not an altogether unlikely occurrence), these manufacturers would have their after-tax cost of manufacturing reduced by 92 percent. Although this will not in and of itself encourage companies to manufacture equipment solely for the purpose of donations, it will dramatically reduce the risks of overproduction. A manufacturer may well overproduce knowing that should the market fail to absorb the excess, the taxpayer may absorb 92 percent of the cost of their mistake. For obvious reasons it may work to the public detriment to offer this encouragement.

In addition to the minimization of risks of overproduction, the code change also has other unpleasant consequences. First, it is designed to most reward those companies in the highest corporate tax brackets and those whose products have the greater profit margins. Note that this is not a problem so long as the contributions are subsumed under the "General Rule."

Secondly, it seems unlikely that school districts will turn away such gratuities even though no immediate need is present. If only 25 percent of the contributed computers are unneeded, the cost to the taxpayer is 68 percent greater than if the needed 75 percent were purchased from the manufacturer at his cost. Sales at cost would still gain the manufacturer the sought-after free advertising, the potential of which may be enormous. As one marketing manager for Apple stated: "You learn

on a particular computer, you become comfortable on a particular computer, all things being equal, you're likely to buy that computer." [8]

If the computer industry's perception of the potential of "hands-on" advertising is positive, such acquisitions would be easy to come by. However, the real advantage would be that the school districts would be responsible for both the justification of the acquisition and the overall tax impact.⁵

It must be understood that each and every contribution carries with it a direct cost to the taxpayer. Perhaps the most objectionable feature of pending legislation is that it encourages school systems to behave in ways that when generalized are fiscally irresponsible. The appropriations legislation, H.R. 3750, minimizes this problem, though at a cost of \$3 billion over 10 years.

The Issues the Bills Fail to Address

The tax consequence of the proposed legislation is not the only objectionable feature. Table I summarizes these bills in terms of their major provisions.⁶ One immediate concern is the lack of consideration given to software. H.R. 91, H.R. 701, and S. 108 allow only hardware to qualify as a contribution. Inasmuch as packaged software is a *sine qua non* in a computer-aided-instruction (CAI) environment, it seems both arbitrary and unreasonable to accord hardware a privileged status. H.R. 2417 only allows contributed software to qualify for a deduction if it is provided by the hardware manufacturer.

It would seem that, if Congress wanted to provide the student with the best of facilities, its members would do all they could to encourage the acquisition of the widest range of current software. Slighting the schools on software is certainly not consistent with the overall ambitions of the proposals at hand. Further, only S. 1194, S. 1195, and H.R. 3098 allow contributed services to qualify for tax credit. A school system that lacks a sufficient budget to support its acquisitions may find them to be an onerous gratuity.

The issue of the sources and types of hardware that will qualify as a contribution seems to have been treated in an equally cavalier fashion. Only H.R. 2417, S. 1194, S. 1195, and H.R. 3098 require that a monitor be included in the hardware package. It is difficult to comprehend how the student will use these computers without a monitor. Perhaps the authors of these bills feel that similar legislation in the past has inundated schools with unneeded televisions that can be scavenged for this purpose. Further, only H.R. 2417 requires that the contribution contain some form of secondary storage. Once again it is hard to imagine nontrivial uses of computers with this deficiency.

⁵ Particularly worrisome in this regard is the fact that neither H.R. 701 nor S. 108 require the approval of the school district's governing board for the contribution. Presumably, schools and teachers may act unilaterally.

⁶ Some bills contain additional provisions that are beyond our immediate concern. S. 108, for example, provides for tax credits to corporations that provide teachers to vocational schools. H.R. 3750 allows for funding of Teacher Training Institutes, and so forth. However, the nucleus of that portion of each bill relevant to our discussion is reflected in Figure 3.



Although few bills require that monitors and peripherals be included in the contribution, all bills make allowances for them. However, not all allowances are intuitive. H.R. 91, H.R. 701, and H.R. 2417 require that, if peripherals be contributed at all, they must be contributed by the same manufacturer that contributed the CPU. It is not obvious how any particular public benefit accrues by excluding manufacturers of plug-compatible peripherals.

Further all nonallocation bills except S. 108 specifically allow for the contribution of "any installation equipment." The public should be aware that a liberal reading of this provision would include such equipment as air purifiers, temperature/humidity control systems, static control products, and computer furniture. Such a liberal interpretation could extend this questionable tax incentive to a variety of industries.

Legislation Too Hastily Conceived

To be sure, the aforementioned are not the only areas of concern. Only four of the bills require that the contributed property be under some sort of warranty. Again, only four make mention of a concern that the equipment be determined in advance to be suitable for use in an educational environment. Further, each of the bills requires that the donee guarantee compliance with the terms of the bill only to the contributor. This last provision is perhaps the strangest feature of all.

As the above discussion illustrates, much of the legislation at hand seems poorly conceived and hastily prepared. What is most disappointing about them all is that they appear to approach a worthwhile goal with strategies that guarantee abuse.

As mentioned earlier, there already exist adequate incentives, both in section 170(e)(1) of the IRC and in

TABLE I. Major Features of Pending Computer Contributions Legislation

| | H.R. 91 | H.R. 701 | S. 108 | H.R. 2417 | S. 1194 | S. 1195 | H.R. 3098 |
|---|----------------|-----------|-----------|------------------|------------------------------|------------------|------------------|
| Date of | | | | | | | |
| Introduction | 1-3-83 | 1-6-83 | 1-26-83 | 5-3-83 | 5-3-83 | 5-3-83 | 5-23-83 |
| IRC | 170(e)(1) | 170(e)(1) | 170(e)(1) | 170(e)(1) | 170(e)(4) | 170(e)(4) | 170(e)(4) |
| Duration | 1 yr | 1984 | open | 1 yr | 5 yrs | 5 yrs | 5 yrs |
| Focus | | | | | | | |
| Public Schools | X | X | | X | X | X | X |
| Low/Mid Inc. Public Schools | X ¹ | | | | | | |
| Vocational | | | X | | | X | |
| Higher Ed. | | | | | X | X | X |
| Museums | | | | | X | | X |
| Prisons | | | | | X | | X |
| Allowed Contributions | | | | | | | |
| Hardware | X | X | X | X | X | X | X |
| Software | | | | X | X | X | X |
| Noncomputer Instruments | | | | | X | X | X |
| Services | | | | | X | X | X |
| Max. Corporate Contribution | open | open | open | open | 20% of annual sales | | |
| Max. Corporate Deduction | open | open | open | open | 10% of annual taxable income | | |
| Restrictions on Contributor | | | | | | | |
| -must be manufacturer | Y | Y | N | Y | Y | Y | Y |
| -max. age of equipment ³ | 6 mos | 6 mos | open | 6 mos | 6 mos | 6 mos | 6 mos |
| -unused | Y | Y | open | Y | Y | Y | Y |
| -100% contribution | Y | Y | Y | Y | Y | Y | Y |
| -plan ² | N/R | N/R | N/R | Y | Y | Y | Y |
| Max. Deduction/Unit (% of basis) | | | | | | | |
| Hardware | 200% | 200% | 200% | 125% | 200% | 200% | 200% |
| Software | N/A | N/A | N/A | N/A | FMV | FMV | FMV |
| Hardware Requirements | | | | | | | |
| Languages Supported | 3 | 3 | open | 3 | 3 | 3 | 3 |
| Min. Primary Storage | 32K | 32K | open | 16K ⁴ | 16K ⁴ | 16K ⁴ | 16K ⁴ |
| Monitor Required | No | No | No | Yes | Yes | Yes | Yes |
| Peripherals Required | none | none | none | DISK only | none | none | none |
| Must be Suitable for Educ. Use | N/R | N/R | N/R | Y | Y | N/R | Y |
| Must be Covered by Warranty | N/R | N/R | N/R | Y | Y | Y | Y |
| Restrictions on Use | | | | | | | |
| -primarily for student education | Y | Y | Y | Y | Y | Y | Y |
| -compliance guarantee | Y | Y | Y | Y | Y | Y | Y |
| -governing body consent | Y | N | N | Y | Y | Y | Y |

LEGEND: N/A = not allowed N/R = not required FMV = fair market value

¹ At least 75% of total contribution must be to low/middle income schools.

² Four bills require that contribution be made pursuant to written plan guaranteeing equitable distributions of property.

³ Since date of manufacture.

⁴ Must be expandable to 48K.

the advertising potential to the contributors, to encourage manufacturers to provide the school systems with additional computational resources. That the greater use of computers and CAI in public schools and universities is desirable is not open to serious doubt. In an appropriate context where use is supervised by skilled personnel, computers have great pedagogical value. However, in the absence of such a context they will be of marginal utility and may even detract from the learning experience.

The indiscriminate acquisition of computing resources that these pieces of legislation encourage will accomplish no more than more conservative approaches that require that the donee justify both the need for the resources and the ability to use them effectively prior to the actual acquisition.

In sum, the lack of public control over the contributions together with the enormous potential costs force me to seriously question the wisdom of enacting this type of legislation.

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Congressman Stark and Professor Berghel were given the opportunity to respond to each other's viewpoints

Berghel's response to Stark:

Apparently, Congressman Stark and I are one concerning the specifics of the proposed legislation. Our disagreement concerns only the desirability of enacting the proposed legislation, and the anticipated overall tax consequences. In his words, this sort of legislation is "... one of the best marriages of a variety of interests. . ."

My belief, to extend his metaphor, is that this is going to be an extremely expensive wedding, and that the cost of the nuptials should be borne by the betrothed and not by the federal tax payer.

According to Stark, the estimated cost to the taxpayer of H.R. 701 would be \$60 million. Let's assume for the moment that the donated equipment would in every case be complete (i.e., no additional software, peripherals, furniture, etc., would be needed to gain full advantage of the donated computers).

At an average "donation cost" to the taxpayer of \$1,000 (92 percent of the manufacturer's cost of production), the number of computers to reach the schools would be 60,000. In the U.S., there are 40 million students currently enrolled in primary and secondary schools. The projected \$60 million thus buys only one computer for every 663 students. I can't imagine that a school district would be content with

this ratio. I conjecture that the public expense of H.R. 701, or any of its siblings, will be very much greater than the estimate.

Consider that the proponents of H.R. 3750 claim that computer resources sufficient to promote computer literacy would cost \$3 billion over the next 10 years. Stark's figures seem suspect to me.

Even if the estimates were low by a factor of 10, the price would be justified if a genuine deficiency in our educational system were overcome. Stark seems to believe that one of our primary educational objectives should be to expose our children to computers.

My feeling is that our goal should be to prepare our children for computers. For a student well-grounded in formal logic, discrete mathematics and the physical sciences, computer literacy will be a breeze. In the absence of such training, no degree of "exposure" to computers will overcome their deficiencies.

In my view, if there is a genuine deficiency in our educational system, it is that it has lost sight of the objectives of a diversified, well-rounded education—not that it has failed to keep pace with technological change.

Of course, my previous remarks are concerned primarily with the issue of computer literacy (i.e.,

where the computer is the object of study). In addition, the computer may be an instrument for study—an instructional tool of enormous pedagogical benefit when used in an appropriate context by skilled personnel.

But the key to success is selective placement in subject areas where the skill levels of the instructional staff justify acquisition. For example, the use of LOGO to teach mathematical concepts could be of significant instructional value. However, little benefit accrues to the use of LOGO as an end in itself. In the few examples that I have seen of the use of LOGO in the public schools, the emphasis has been more on this latter use than on the former. I have doubts whether Papert's objectives are being realized. All too often the students are more concerned with the use of the Turtle to draw on the CRT than with geometrical concepts. And the influx of computers into the public schools will do little to change the situation.

Although the previous reflections bear little on the topic, they illustrate why I think that the unrestricted acquisition of computers by a school system is a bad idea. I cannot imagine how a school system could resist the offer of "free" computers, irrespective of whether their need is real or imagined. For this reason, I disagree that the schools will gain computer equipment "... that the taxpayer would be buying sooner or later." If required to justify their computer acquisitions, school systems would be found to have much more modest and purposeful computational requirements.

I remarked in my article that such legislation as H.R. 701 "... will not in and of itself encourage companies to manufacture equipment solely for the purpose of donations, (but) it will dramatically reduce the risks of over-production."

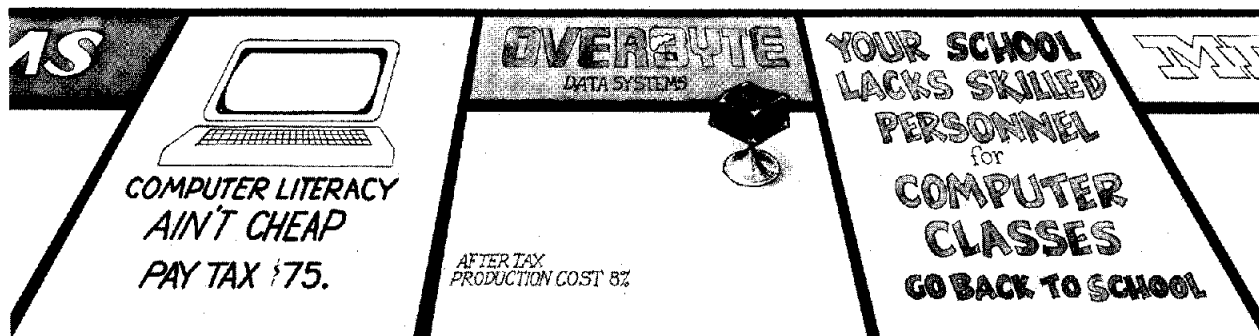
The legislation under consideration reduces these

risks so long as there are school systems that will accept these donations. If a manufacturer thinks there is a 90 percent probability there will be a demand for x units and a 60 percent probability there will be a demand for $x + y$ units, he or she may well overproduce knowing that, as far as the overproduction is concerned, the worst case is an 8 percent loss on y units. One would certainly be more willing to gamble in this case than if the worst case were a 100 percent loss.

As I have argued, the cost of the proposed legislation seems to far outweigh any public benefits that might accrue. This is not to deny that there are educational advantages to the use of computers in the schools. In some circumstances, mathematical, logical, and scientific concepts may be better taught in a carefully prepared experimental environment. Involvement in practical projects often times generates enthusiasm that would not otherwise be present. Further, computer experiences may even make abstract concepts more comprehensible.

But these observations do not support the claim that a significant increase in the number of computers in the schools will translate into a significant increase in student performance. We need to get away from this more-is-better syndrome and focus our attention on the quality of the educational experience rather than the quantity of teaching aids available. We have ample evidence that teaching aids are not the primary determinants of a successful educational environment.

Stark has done little to assuage my fears that the proposed legislation does little more than provide a method of indirectly subsidizing computer manufacturers. In addition, and for reasons given earlier, this legislation is as a whole poorly thought through.



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Yes, this legislation will cost the taxpayer money. Yes, it will cause a distortion in the tax code for one year by adding a "loophole." But the ultimate impact of H.R. 701 is worth it. It is a bridge to the future for our children.

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